



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

JUN 21 2013

Mr. Thomas Frick
Director
Division of Environmental Assessment & Restoration
Florida Department of Environmental Protection
Mail Station 3000
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Frick:

The U.S. Environmental Protection Agency has completed its review of the document titled *Nutrient TMDL for Sanibel Slough (WBIDs¹ 2092F1 and 2092F2)*. The Florida Department of Environmental Protection (FDEP) submitted the Sanibel Slough (TMDLs) and revised Chapter 62-304, Florida Administrative Code (F.A.C.),² including the numeric nutrient criteria (NNC) for the subject water, in a letter to the EPA dated March 15, 2018, as a total maximum daily load (TMDL) and as new or revised water quality standards (WQS) with the necessary supporting documentation and certification by the FDEP General Counsel, pursuant to Title 40 of the Code of Federal Regulations part 131.

The NNC were adopted under Chapter 62-304.805(4)-(5) as site-specific numeric interpretations of paragraph 62-302.530(48)(b). As referenced in paragraph 62-302.531(2)(a), the chlorophyll *a*, total nitrogen, and total phosphorus TMDLs for Sanibel Slough would also constitute a site-specific numeric interpretation of the narrative nutrient criterion set forth in paragraph 62-302.530(48)(b), for this water segment.

The FDEP submitted the Sanibel Slough TMDLs to the EPA for review pursuant to both Clean Water Act (CWA) sections 303(c) and 303(d) since the TMDL will also act as a Hierarchy 1 (H1) site-specific interpretation of the state's narrative nutrient criterion pursuant to 62-302.531(2)(a)1.a. The EPA acknowledges that by virtue of establishing the TMDL in chapter 62-304, the FDEP is also establishing an H1 interpretation of the narrative nutrient criteria for this waterbody as new or revised WQS. The enclosed, combined WQS and TMDL decision document summarizes the EPA's review and approval of the WQS and TMDLs.

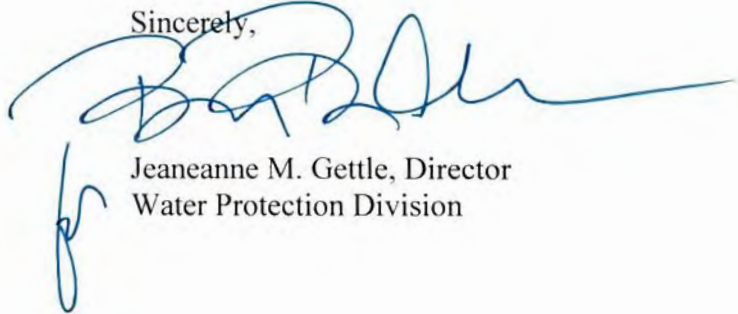
¹ WBID refers to **waterbody identification**

² Unless otherwise stated, all rule and subsection citations are to provisions in the Florida Administrative Code.

In accordance with sections 303(c) and (d) of the CWA, I am hereby approving the TMDLs promulgated in Chapter 62-304 for Sanibel Slough as both TMDLs and as revised WQS for chlorophyll *a*, total nitrogen and total phosphorus. Any other criteria applicable to these waterbodies remain in effect. The requirements of paragraph 62-302.530(48)(a) also remain applicable.

If you have any comments or questions relating to the approval of the H1 WQS or TMDLs, please contact me at (404) 562-9345, or have a member of your staff contact Dr. Katherine Snyder in the WQS program at (404) 562-9840 or Ms. Laila Hudda of the TMDL program at (404) 562-9007.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Jeaneanne M. Gettle', with a long horizontal flourish extending to the right.

Jeaneanne M. Gettle, Director
Water Protection Division

Enclosure

cc: Mr. Kenneth Hayman, FDEP
Mr. Daryll Joyner, FDEP
Ms. Erin Rasnake, FDEP

Florida Numeric Interpretation of the Narrative Nutrient Water Quality Criterion Through Total Maximum Daily Loads (TMDLs) to Establish a Hierarchy 1 (H1): Joint Water Quality Standards (WQS) and TMDL Decision Document

H1: Nutrient TMDL for Sanibel Slough (waterbody identification (WBIDs) 2092F1 and 2092F2)

ATTAINS TMDL ID: 68442

Location: Lee County, Florida

Status: Final

Criteria Parameter(s): For WBID 2092F1, the TMDL establishes criterion of 11 µg/L for chlorophyll *a* (Chl*a*) expressed as an annual geometric mean (AGM) not to be exceeded more than once in any consecutive 3-year period. For the TMDL allocation and water quality criteria, the report establishes 1,903 kg/yr for total nitrogen (TN) and 242 kg/yr for total phosphorus (TP) expressed as a rolling 3-year annual average load, not to be exceeded.

For WBID 2092F2, the TMDL establishes criterion of 21 µg/L for Chl*a* expressed as an AGM not to be exceeded more than once in any consecutive 3-year period. For the TMDL allocation and water quality criteria, the report establishes 1,091 kg/yr for TN and 123 kg/yr for TP expressed as a rolling 3-year annual average load, not to be exceeded.

Impairment/Pollutant: Two water bodies (see next page) in the Charlotte Harbor Basin are not meeting water quality criteria for Tropic State Index (TSI) and not supporting the designated uses of Class III Marine (fish consumption; recreation; and propagation and maintenance of a healthy, well-balanced population of fish and wildlife). An H1 was submitted by the Florida Department of Environmental Protection (FDEP) that establishes site-specific criteria for TN, TP and Chl*a* and provides loads to address the impairment.

Background: The FDEP submitted the final H1 for the *Nutrient TMDL for Sanibel Slough (WBIDs 2092F1 and 2092F2)* (the “report”) by letter dated March 15, 2018. The draft report for Sanibel Slough is dated January 2017 and was received January 20, 2017. The final H1 report dated August 2017 includes site-specific criteria and a TMDL expressed as loads and was received on March 19, 2018.

The submission included:

- Submittal letter
- *Nutrient TMDL for Sanibel Slough (WBIDs 2092F1 and 2092F2)* and Documentation in Support of the Development of Site-Specific Numeric Interpretations of the Narrative Nutrient Criterion
- Documents related to Public Workshop
- Documents related to Public Hearing
- Documents related to Public Notice for Rulemaking and Rule Adoption
- Public Comments and Response
- Joint Administrative Procedures Committee Package

EPA HIERARCHY 1 REVIEW DOCUMENT

Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

This document explains how the submission meets the Clean Water Act (CWA) statutory requirements for the approval of WQS under section 303(c) and of TMDLs under section 303(d), and the EPA's implementing regulations in Title 40 of the Code of Federal Regulations (40 CFR) parts 131 and 130, respectively.

REVIEWERS: WQS: Jamal Cooper, Environmental Engineer, cooper.jamal@epa.gov
TMDL: Laila Hudda, Environmental Engineer, Hudda.laila@epa.gov

Waterbodies addressed in this H1 Approval Action:

Sanibel Slough West	WBID 2092F1	1,978 acres
Sanibel Slough East	WBID 2092F2	1,225 acres



Figure 1. Sanibel Slough Basin map and control weirs

EPA HIERARCHY 1 REVIEW DOCUMENT

Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

This document contains the EPA's review of the above-referenced H1. This review document includes WQS and TMDL review guidelines that state or summarize currently effective statutory and regulatory requirements applicable to this approval action. Review guidelines are not themselves regulations. Any differences between review guidelines and the EPA's implementing regulations should be resolved in favor of the regulations themselves. The italicized sections of this document describe the EPA's statutory and regulatory requirements for approvable H1s. The sections in regular type reflect the EPA's analysis of the state's compliance with these requirements.

1. WQS Decision – Supporting Rationale

Section 303(c) of the CWA and the EPA's implementing regulations at 40 CFR section 131 describe the statutory and regulatory requirements for approvable WQS. Set out below are the requirements for WQS submissions, under the CWA and the regulations. The information identified below is necessary for the EPA to determine if a submitted WQS meets the requirements of the CWA and, therefore, may be approved by the EPA.

1. Use Designations

Section 131.10(a) provides that each state must specify appropriate water uses to be achieved and protected. The classification of the waters of the state must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation. In no case shall a state adopt waste transport or waste assimilation as a designated use for any waters of the United States.

Assessment: Sanibel Slough is classified as Class III Marine (fish consumption; recreation; and propagation and maintenance of a healthy, well-balanced population of fish and wildlife).

2. Protection of Downstream Uses

Section 131.10(b) provides that in designating uses of a waterbody and the appropriate criteria for those uses, the state shall take into consideration the WQS of downstream waters and shall ensure that its WQS provide for the attainment and maintenance of the WQS of downstream waters.

Rule 62-302.531(4) of the Florida Administrative Code (F.A.C.) requires that downstream uses be protected. Sanibel Slough is severed from the surrounding estuarine areas of the Gulf of Mexico and San Carlos Bay by control weirs. Sanibel Slough West has a weir control structure at Sanibel-Captiva Road on the northern side of the island that discharges into Tarpon Bay, which eventually flows into San Carlos Bay. Sanibel Slough East has a weir control structure, located at Beach Road on the eastern side of the island, which drains to a system of canals that eventually flows into San Carlos Bay. The slough is managed to keep the interior wetlands hydrated while maintaining flood protection for developed areas in the island's interior. This strategy results in minimal discharges from the control weirs except in extreme storm events.

San Carlos Bay (including Tarpon Bay, WBID 2065H1) is a Class II estuary that has estuary-specific numeric interpretations of the numeric nutrient criteria (NNC) for Chl_a, TN, and TP. Based on the most recent assessment, completed on April 27, 2016, for the Group 2 Basins, San Carlos Bay is not impaired for nutrients. As evidenced by the healthy existing condition in San Carlos Bay, the existing loads from Sanibel Slough to San Carlos Bay have not led to an impairment of the downstream water. Therefore, the reductions in nutrient loads prescribed in the Sanibel Slough TMDL are not expected to cause nutrient impairments downstream.

Assessment: The H1 is providing use protection for the downstream waters.

EPA HIERARCHY 1 REVIEW DOCUMENT
Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

3. Water Quality Criteria

Section 131.11(a) provides that states must adopt those water quality criteria that protect the designated use. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. For waters with multiple use designations, the criteria shall support the most sensitive use.

The FDEP used the TSI to determine that Sanibel River was impaired for nutrients. Subsequent assessments and reclassifications from a lake, to a stream, to an estuary indicated that the NNC were also not being met. To establish the revised nutrient criteria for Sanibel Slough, the FDEP utilized natural background model simulations to determine targets protective of the waterbody's designated uses. The modeling resulted in a Chl a criterion of 11 $\mu\text{g/L}$ for Sanibel Slough West and 21 $\mu\text{g/L}$ for Sanibel Slough East. The conditions protective of the waterbody's designated use are expressed as the 80th percentile of the natural background values plus the percent difference between the means of the measured and model-predicted Chl a concentrations. Adding the percent difference of the predicted and measured means to the 80th percentile of the background distribution ensures that the full range of naturally occurring Chl a concentrations is used to establish the site-specific target for the waterbody, and that natural conditions are not unintentionally abated due to model uncertainty. These levels would sustain a low eutrophic condition and would not abate the natural condition while maintaining and protecting the natural condition's designated uses. See 62-302.531(2)(b), F.A.C.

In order to determine site-specific TN and TP targets for the TMDL, the FDEP used a modeling approach to relate simulated watershed TN and TP loads to simulated Chl a concentrations. The watershed simulation was conducted using a modified Soil Conservation Service (SCS) curve number (CN) method for watershed runoff calculation and multiplying the runoff volume by Sanibel-specific TN and TP event mean concentrations to calculate the total watershed nutrient loads for each basin. In this TMDL, nutrients deposited onto the estuary from the atmosphere and nutrient loadings through ground water seepage and stormwater runoff were accounted for through approximation and studies conducted by the Sanibel-Captiva Conservation Foundation (SCCF) Marine Lab. All modeled nutrient loads were entered into the lake BATHTUB eutrophication model (nutrient balance model and eutrophication response model), which was developed by the United States Army Corps of Engineers to simulate ambient lake TN, TP, and Chl a concentrations. The BATHTUB model was chosen for Sanibel Slough because of the reservoir-like nature of the system, caused by the weir-controlled water levels. Additional modeling methodology used in this report included a modified St. Johns River Water Management District Pollutant Load Simulation Model.

In addition, the watershed nutrient loadings were linked to the ambient lake TN, TP, and Chl a concentrations through appropriate model calculations and adjustments. The natural background TN, TP, and Chl a concentrations of the lake were simulated by converting all human land uses in the watershed model to natural land areas (forest/wetland area). The final TN and TP concentration targets were calculated by modeling the concentrations needed to achieve the Chl a criterion of 11 $\mu\text{g/L}$ in the West Basin and 21 $\mu\text{g/L}$ in the East Basin. The anthropogenic loads were incrementally decreased until a Chl a concentration of 11 $\mu\text{g/L}$ was achieved every year for the West Basin. The TN and TP loads under the established protective condition were used as the TN and TP loads for the TMDL condition for the East Basin. The final TN concentration was determined to be 1.60 mg/L for the West Basin and 1.00 mg/L for the East Basin. The final TP concentration was determined to be 0.06 mg/L for the West Basin and 0.04 mg/L for the East Basin. By utilizing the water quality models listed above, the FDEP

EPA HIERARCHY 1 REVIEW DOCUMENT

Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

established nutrient loads that attain the target TN and TP concentrations and Chl a criterion. The developed TMDLs “are the site-specific numeric interpretations of the narrative nutrient criterion for Sanibel Slough.”

Assessment: The Sanibel Slough TMDL allocation and NNC is 1,903 kg/yr for TN and 241 kg/yr for TP for the West Basin and 1,091 kg/yr for TN and 123 kg/yr for TP for the East Basin, expressed as 3-year average loads not to be exceeded. The loads were derived from watershed model TN and TP targets of 1.60 mg/L for TN and 0.06 mg/L for TP for the West Basin and 1.00 mg/L for TN and 0.04 mg/L for TP for the East Basin. The concentrations are given for comparative purposes only. The criteria are expressed as loads. The resulting water quality will protect the designated uses for this waterbody. Any other criteria applicable to this waterbody remain in effect, including the nutrient criteria for parameters set out in 62-302.531(2)(b) F.A.C.

4. Scientific Defensibility

Section 131.11(b) provides that, in establishing criteria, states should establish numerical values based on 304(a) guidance, 304(a) guidance modified to reflect site-specific conditions, or other scientifically defensible methods.

Sanibel River was verified for impairment for nutrients based on an elevated annual average TSI during the Group 2 Basins, Cycle 1 verified period. At the time, the Cycle 1 assessment was performed, WBID 2092F was classified as a high-color lake (color higher than 40 Platinum-Cobalt Units), and the Impaired Surface Waters Rule (IWR) methodology used the water quality variables Chl a , TN, and TP in calculating annual TSI values and in interpreting Florida's narrative nutrient threshold. The TSI threshold of 60 for high-color lakes was exceeded in multiple years during the verified period and was identified as impaired for nutrients. During the Cycle 2 assessment, WBID 2092F was reclassified as a stream, and the annual mean Chl a values exceeded the threshold of 20 μ g/L in 2007. The waterbody was again reclassified for the more recent Cycle 3 assessment and was assessed as an estuary because of long-term specific conductance and the plant community characterization. The IWR methodology used an AGM Chl a threshold of 11 μ g/L and subsequent assessments indicated the estuary was impaired for Chl a .

This TMDL document based the TN and TP targets on the natural background model to establish a condition protective of the designated use. The modeling established a Chl a criterion of 11 μ g/L for Sanibel Slough West and 21 μ g/L for Sanibel Slough East. The loads were derived from watershed model TN and TP targets of 1.60 mg/L for TN and 0.06 mg/L for TP for the West Basin and 1.00 mg/L for TN and 0.04 mg/L for TP for the East Basin. The concentrations are given for comparative purposes only. These values correspond to 3-year average loads of TN of 1,903 kg/yr. and TP of 241 kg/yr for the West Basin and TN of 1,091 kg/yr and TP of 123 kg/yr for the East Basin, not to be exceeded. The resulting water quality is expected to protect the designated uses for this waterbody.

Assessment: The EPA determined that the selection of a Chl a value of 11 μ g/L and 21 μ g/L as the response variable target is appropriate and the technical approach to calculate the total watershed nutrient loads results is scientifically sound. These approaches, which include the U.S. Army Corps of Engineers BATHTUB model and SCS CN method to calculate the total watershed nutrient loads, are described in the cited TMDL document.

EPA HIERARCHY 1 REVIEW DOCUMENT

Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

5. Public Participation

Section 131.20(b) provides that states shall hold a public hearing when revising WQS, in accordance with provisions of state law and the EPA's public participation regulation (40 CFR part 25). The proposed WQS revision and supporting analyses shall be made available to the public prior to the hearing.

A public workshop was conducted by the FDEP on June 6, 2017, in Sanibel, Florida, to obtain comments on the draft nutrient TMDL for Sanibel Slough. The workshop notice indicated that the nutrient TMDLs, if adopted, constitute site-specific numeric interpretations of the narrative criterion set forth in paragraph 62-302.530(48)(b), F.A.C. the FDEP also held a public hearing on August 25, 2017, in Tallahassee, Florida.

Assessment: The FDEP has met the public participation requirements for this H1.

6. Certification by the State Attorney General

Section 131.6(e) requires that the state provide a certification by the state Attorney General or other appropriate legal authority within the state that the WQS were duly adopted pursuant to state law.

A letter from the FDEP General Counsel, Robert A. Williams, dated March 15, 2018, certified that the Sanibel Slough TMDLs were duly adopted as WQS pursuant to state law.

Assessment: The FDEP has met the requirement for Attorney General certification for this H1.

7. Endangered Species Section 7 Consultation

Section 7(a)(2) of the Endangered Species Act (ESA) requires federal agencies, in consultation with the Services, to ensure that their actions are not likely to jeopardize the continued existence of federally listed species or result in the destruction or adverse modification of designated critical habitat of such species.

The EPA initiated informal consultation with the National Marine Fisheries Service (NMFS) with a letter to Cathy Tortorici, NMFS, on April 26, 2018. NMFS responded with a letter of concurrence on the proposed Chla, TN, and TP criteria for Sanibel Slough with a letter dated May 25, 2018.

Assessment: The EPA has met the ESA requirements for this action.

EPA HIERARCHY 1 REVIEW DOCUMENT

Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

II. TMDL Review

Section 303(d) of the CWA and the EPA's implementing regulations at 40 CFR Part 130 set out the statutory and regulatory requirements for an approvable TMDL. The following information is generally necessary for the EPA to determine if a submitted TMDL fulfills the legal requirements for approval under section 303(d) and the EPA regulations and should be included in the submittal package. Use of the verb "must" below denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation.

1. Description of Waterbody, Pollutant of Concern, and Pollutant Sources

The TMDL analytical document must identify the waterbody as it appears on the state's 303(d) list, including the pollutant of concern. The TMDL submittal must include a description of the point and nonpoint sources of the pollutant of concern, including the magnitude and location of the sources. Where it is possible to separate natural background from nonpoint sources, a description of the natural background must be provided, including the magnitude and location of the source(s). Such information is necessary for the EPA's review of the load and wasteload allocations, which are required by regulation. The TMDL submittal should also contain a description of any important assumptions made in developing the TMDL, such as: (1) the assumed distribution of land use in the watershed; (2) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources; (3) present and future growth trends, if taken into consideration in preparing the TMDL; and (4) explanation and analytical basis for expressing the TMDL through surrogate measures, if applicable. Surrogate measures are parameters such as percent fines and turbidity for sediment impairments or Chla and phosphorus loadings for excess algae.

Sanibel Slough is in the Charlotte Harbor Basin on Sanibel Island as seen in Figure 1 of this document. Sanibel and the adjacent island of Captiva are barrier islands separated from the mainland by San Carlos Bay and Pine Island Sound. The waterbody was identified as impaired for nutrients based on elevated annual average TSI and was added to the 303(d) list by Secretarial Order on May 27, 2004, as the segment with WBID number 2092F. Subsequently, Sanibel Slough was reclassified as an estuarine system and then subdivided into two Basins, Sanibel Slough West (WBID 2092F1) and Sanibel Slough East (2092F2). Data from IWR Run 52 presented in Table 2.1 of the report, indicated that the 2 new WBIDs were still impaired for nutrients based on Chla concentrations that exceeded the 11 µg/L assessment threshold for non-estuarine nutrient region estuaries during most years.

Land use classification for the contributing areas in the Sanibel Slough Basin presented in Table 1.1 and Figure 1.7 of the report showed that wetlands covered 40 % of the East Basin and 55 % of the West Basin. The East Basin had a higher rate of residential development per subbasin acreage (34%) and 103 acres of commercial development compared with approximately 29 % of residential development per subbasin acreage and 16 acres of commercial development in the west. Nutrient loading from urban areas is most often attributed to multiple sources including stormwater runoff, leaks and overflows from sanitary sewer systems, illicit discharges of sanitary waste, runoff from the improper disposal of waste materials, leaking septic systems, and domestic animals. The largest anthropogenic land use in the Sanibel Slough watershed consists of residential areas. These areas, as well as golf courses, which are classified under "recreational" land use, can contribute nutrients from fertilizer application. Nonpoint sources of nutrient loading through three pathways: atmospheric deposition loads, groundwater loads, and stormwater runoff loads were explicitly included in the TMDL analysis in the watershed model discussed in section 3.1.1. of the report

The report identifies two National Pollutant Discharge Elimination System (NPDES) wastewater facilities in the Sanibel Slough Basins: The Island Water Association Inc. (IWA) (NPDES FL0025593) permitted to discharge to an underground injection well and through a surface water discharge outfall to

EPA HIERARCHY 1 REVIEW DOCUMENT

Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

the Gulf of Mexico, and the Donax Water Reclamation Facility (WRF) (FLA014430). There are no direct discharges to surface waters of Sanibel Slough. However, water from the IWA and Donax facilities is used for irrigation in the Sanibel Slough watershed and is suspected to be a major source of nutrient loading in the East and West Basins, and percolation from irrigation water could be a potential source of nutrient loads to groundwater. Municipal Separate Storm Sewer Systems (MS4s) may also discharge pollutants to waterbodies in response to storm events. The NPDES Phase I MS4 permit (FLS000035) covers the entire extent of Sanibel Island, and the co-permittees are Lee County and the City of Sanibel. The stormwater collection systems in the Sanibel Slough Watershed are owned and operated by the City of Sanibel.

Assessment: The EPA concludes that the FDEP has adequately identified the impaired waterbodies, the pollutant of concern, and the magnitude and location of the pollutant sources.

2. Description of the Applicable WQS and Numeric Water Quality Target

The TMDL submittal must include a description of the applicable state WQS, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the statewide antidegradation policy. Such information is necessary for the EPA's review of the load and wasteload allocations which are required by regulation. A numeric water quality target for the TMDL (a quantitative value used to measure whether or not the applicable WQS is attained) must be identified. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, usually site-specific, must be developed from a narrative criterion and a description of the process used to derive the target must be included in the submittal.

As described in WQS review sections I-1 and I-3 of this document, Sanibel Slough is a Class III (marine) waterbody subject to the narrative nutrient criterion in paragraph 62-302.530(48)(b). The FDEP believes that the estuary-specific NNC established in this report are more representative of natural conditions in the lake than the generally applicable narrative nutrient criteria. This action does not revise the generally applicable narrative nutrient criteria.

The TN target concentration were 1.60 mg/L for the West Basin and 1.00 mg/L for the East Basin and TP target concentration were 0.06 mg/L for the West Basin and 0.04 mg/L for the East Basin. These targets were derived based on the background condition of modeling results for the nutrient concentrations needed to achieve the applicable Chla criterion of 11 µg/L in the West Basin and 21 µg/L in the East Basin. Using the water quality models, the FDEP established the nutrient loads and target TN and TP concentrations that attain the target Chla criterion. The nutrient loads of 1,903 kg/yr for TN and 241 kg/yr for TP for the West Basin and 1,091 kg/yr for TN and 123 kg/yr for TP for the East Basin are the site-specific numeric interpretations of the narrative nutrient criterion for Sanibel Slough. The detailed process for developing the applicable water quality standard and the water quality targets is explained in Chapters 2 and 3 of the report and is also summarized in section I-3 of this document.

Assessment: The EPA concludes that the FDEP has properly addressed its WQS when setting a numeric water quality target.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

As described in the EPA guidance, a TMDL identifies the loading capacity of a waterbody for a particular pollutant. The EPA regulations define loading capacity as the greatest amount of loading that a water can receive without violating WQS (40 CFR section 130.2(f)). The loadings are required to be expressed as either mass-per-time, toxicity or other appropriate

EPA HIERARCHY 1 REVIEW DOCUMENT

Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

measure (40 CFR section 130.2(i)). The TMDL submittal must identify the waterbody's loading capacity for the applicable pollutant and describe the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In most instances, this method will be a water quality model. Supporting documentation for the TMDL analysis must also be contained in the submittal, including the basis for assumptions, strengths and weaknesses in the analytical process, results from water quality modeling, etc. Such information is necessary for the EPA's review of the load and wasteload allocations which are required by regulation.

In many circumstances, a critical condition must be described and related to physical conditions in the waterbody as part of the analysis of loading capacity (40 CFR section 130.7(c)(1)). The critical condition can be thought of as the "worst case" scenario of environmental conditions in the waterbody in which the loading expressed in the TMDL for the pollutant of concern will continue to meet WQS. Critical conditions are the combination of environmental factors (e.g., flow, temperature, etc.) that results in attaining and maintaining the water quality criterion and has an acceptably low frequency of occurrence. Critical conditions are important because they describe the factors that combine to cause a violation of WQS and will help in identifying the actions that may have to be undertaken to meet WQS.

As described in Chapter 3 of the report and summarized in section I-3 of this document, the BATHTUB model was chosen for Sanibel Slough because of the reservoir-like nature of the system, caused by the weir-controlled water levels. The model was set up to simulate estuary TN, TP, and Chl a concentration each year from 2007 to 2013 based on simulated TN and TP loads. The measured AGM concentrations for TN, TP, and Chl a were calculated from available water quality data and were used to calibrate the model by adjusting the simulated concentrations until they were within an acceptable range of the measured values. The results of the model calibration using the percent difference between the simulated and measured values indicated that overall, the percent differences were within a range that is described as "good" to "very good," according to generally accepted model calibration tolerances based on Donigian's metrics¹.

To achieve the Chl a target of 11 $\mu\text{g/L}$ in the West Basin and 21 $\mu\text{g/L}$ in the East Basin in every year of the modeling period, the anthropogenic loads were incrementally decreased until the TN and TP loads that achieve the Chl a target were reached. A background condition scenario was also run to ensure that the TMDL condition would not abate the natural conditions.

The existing conditions evaluated for establishing the TMDLs were the TN and TP loads as simulated for the 2007–13 period as summarized in Table 3.8 of the report. For establishing the TMDLs, the existing condition nutrient loads used in the percent reduction calculation are the maximum simulated annual TN and TP loads in the model period. The maximum simulated existing condition nutrient loads for TN are 2,343 kg/yr and 2,568 kg/yr in the West and East Basins, respectively, and the maximum TP loads in the West and East Basins are 363 kg/yr and 544 kg/yr, respectively. The target loads for TN of 1,903 kg/yr and 1,091 kg/yr, and the target TP loads are 241 and 143 kg/yr, in the West and East Basins respectively.

The report stated that the assimilative capacity was based on annual conditions, rather than critical/seasonal conditions. The methodology used to determine assimilative capacity did not lend itself very well to short-term assessments and the FDEP was generally more concerned with the net change in overall primary productivity in the segment, which was better addressed on an annual basis. The

¹ Donigian, A.S., Jr. 2000. HSPF Training Workshop Handbook and CD. Lecture #19. *Calibration and Verification Issues*, Slide #L19-22. EPA Headquarters, Washington Information Center, January 10–14, 2000. Presented to and prepared for the U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

EPA HIERARCHY 1 REVIEW DOCUMENT

Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

approach better corresponds to the methodology used to determine impairment was based on annual conditions (AGMs or arithmetic means.)

Assessment: The EPA concludes that the loading capacity, having been calculated using the EPA-reviewed water quality models, and using observed concentration data and water quality targets consistent with numeric water quality criteria, has been appropriately set at a level necessary to attain and maintain the applicable WQS. The H1 is based on a reasonable approach for establishing the relationship between pollutant loading and water quality.

4. Load Allocation (LA)

The EPA regulations require that a TMDL include LAs which identify the portion of the loading capacity allocated to existing and future nonpoint sources and to natural background (40 CFR section 130.2(g)). LAs may range from reasonably accurate estimates to gross allotments (40 CFR section 130.2(g)). Where it is possible to separate natural background from nonpoint sources, LAs should be described separately for background and for nonpoint sources.

If the TMDL concludes that there are no nonpoint sources and/or natural background, or the TMDL recommends a zero LA, the LAs must be expressed as zero. If the TMDL recommends a zero LAs after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero LAs implies an allocation only to point sources will result in attainment of the applicable WQS, and all nonpoint and background sources will be removed.

Nutrient loading into Sanibel Slough were input into the BATHTUB model through three pathways: atmospheric deposition loads, groundwater loads, and stormwater runoff loads discussed in section 3.1.1 of the report. Table 3.9 of the report summarizes simulated total nutrient loadings from all sources for the West and East Basins, while Figures 3.2 and 3.3 illustrate the average percent contribution of all sources for the West and East Basins, respectively.

To achieve the LAs, current TN and TP loads require a 26% and 34% reduction in the Sanibel Slough West Basin and a 54% and 74% reduction in the Sanibel Slough East Basin, respectively. As the TMDLs are based on the percent reduction in total watershed loading and any natural land uses are held harmless, the percent reductions for anthropogenic sources may be greater. It is noted in the report that the LA includes loading from stormwater discharges regulated by DEP and the water management districts that are not part of the NPDES stormwater program.

Assessment: The EPA concludes that the LAs provided in the TMDL report are reasonable and will result in attainment of the WQS.

5. Wasteload Allocation (WLA)

The EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to existing and future point sources (40 CFR section 130.2(h)). If no point sources are present or if the TMDL recommends a zero WLA for point sources, the WLA must be expressed as zero. If the TMDL recommends a zero WLA after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero WLA implies an allocation only to nonpoint sources and background will result in attainment of the applicable WQS, and all point sources will be removed.

In preparing the WLAs, it is not necessary that each individual point source be assigned a portion of the allocation of pollutant loading capacity. When the source is a minor discharger of the pollutant of concern or if the source is contained within an aggregated general permit, an aggregated WLA can be assigned to the group of facilities. However, it is necessary to allocate the loading capacity among individual point sources as necessary to meet the WQS.

EPA HIERARCHY 1 REVIEW DOCUMENT

Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

The TMDL submittal should also discuss whether a point source is given a less stringent WLA based on an assumption that nonpoint source load reductions will occur. In such cases, the state will need to demonstrate reasonable assurance that the nonpoint source reductions will occur within a reasonable time.

As stated in the report, there are two permitted wastewater treatment facilities located in the Sanibel Slough Watershed: IWA (NPDES FL0025593) and the Donax WRF (FLA014430). However, neither of these facilities have direct discharges to surface waters of Sanibel Slough and hence a WLA for wastewater discharges is not applicable. The only NPDES-permitted discharges identified in the Sanibel Slough watershed that discharge directly to surface waters are stormwater discharges. Lee County and the City of Sanibel are covered by a Phase I NPDES MS4 permit (FLS000035), and areas within their jurisdiction in the Sanibel Slough Watershed are responsible for a 26% reduction in TN and a 34% reduction in TP from the current anthropogenic loading in the West Basin and a 54% reduction in TN and a 74 % reduction in TP in the East Basin.

Assessment: The EPA concludes that the WLAs provided in the TMDL report are reasonable and will result in the attainment of WQS. This is because the H1 accounts for all point sources discharging to impaired segments in the watershed and the WLAs require that TN and TP loads comply with the TMDL targets.

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA section 303(d)(1)(C), 40 CFR section 130.7(c)(1)). EPA 1991 guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

As stated in section 4.4 of the report, consistent with the recommendations of the Allocation Technical Advisory Committee (FDEP 2001)², an implicit MOS was used in the development of these TMDLs, and conservative decisions associated with many of the modeling assumptions in determining assimilative capacity (i.e., loading and water quality response for Sanibel Slough) were made. For example, the TMDLs were developed using water quality results from both high- and low-rainfall years, and the attenuation of nutrients in transport from nonpoint source areas to Sanibel Slough was not considered. Therefore, the required load reductions may lead to lower-than-anticipated nutrient concentrations by the time the loads reach the waterbody. Additionally, the TMDL nutrient load targets are established as annual limits not to be exceeded based on the development of site-specific alternative water quality targets, and reductions are based on maximum existing conditions to ensure that all exceedances of the nutrient targets are addressed. Furthermore, the TMDL nutrient load targets were derived based on the target Chla concentrations being met in every year of the model simulation, providing a margin of safety for achieving the restoration goal of a Chla concentration of 11 µg/L in the West Basin and 21 µg/L in the East Basin, expressed as an AGM, not to be exceeded more than once in any consecutive 3-year period.

² Florida Department of Environmental Protection. 2001. *A report to the Governor and the Legislature on the allocation of total maximum daily loads in Florida*. Tallahassee, FL: Bureau of Watershed Management.

EPA HIERARCHY 1 REVIEW DOCUMENT

Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

Assessment: The EPA concludes that the H1 incorporates an adequate margin of safety.

7. Seasonal Variation

The statute and regulations require that a TMDL be established with consideration of seasonal variations. The method chosen for including seasonal variations in the TMDL must be described (CWA section 303(d)(1)(C), 40 CFR section 130.7(c)(1)).

There is not a seasonal critical condition associated with the TMDL values since they are based on a 3-year rolling average of annual loads, but this level of loading was intended to make it likely that the Chl α criterion, which was determined to be protective year-round, is not exceeded more than once every three years.

Section 2.5 of the report states that the estimated assimilative capacity is based on annual conditions, rather than critical/seasonal conditions because (1) the methodology used to determine assimilative capacity does not lend itself very well to short-term assessments, (2) the FDEP is generally more concerned with the net change in overall primary productivity in the segment, which is better addressed on an annual basis, and (3) the methodology used to determine impairment is based on annual conditions (AGMs or arithmetic means). Seasonal variations are however included within the BATHTUB model by using all available data from 2007 to 2013 including all seasons and a full range of flow and meteorological conditions as direct inputs or calibration points and distinct wet and dry seasonal event mean concentration values for each land use. The TMDLs were developed using water quality results from both high- and low-rainfall years. The annual average rainfall for 2007 to 2013 ranged from 28.5 to 43.0 in/yr, and the median was 37.8 in/yr. The years 2007, 2009, and 2012 were dry, and 2008, 2011, and 2013 were wet. This time span captured the hydrologic variability of the Sanibel Slough system.

Additionally, as prescribed in paragraph 62-302.531(6), F.A.C., to calculate an AGM for TN, TP, or Chl α , there must be at least four temporally independent samples per year taken at least one week apart with at least one sample taken between May 1 and September 30 and at least one sample taken during the other months of the calendar year.

Assessment: The EPA concludes that seasonal variations were considered and that the H1 allocations ensure protection of WQS throughout all seasons.

8. Monitoring Plan to Track TMDL Effectiveness

EPA's 1991 document, Guidance for Water Quality-Based Decisions: The TMDL Process (EPA 440/4-91-001), recommends a monitoring plan to track the effectiveness of a TMDL, particularly when a TMDL involves both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur. Such a TMDL should provide assurances that nonpoint source controls will achieve expected load reductions, and such a TMDL should include a monitoring plan that describes the additional data to be collected to determine if the load reductions provided for in the TMDLs are occurring and leading to attainment of WQS.

The City of Sanibel and the FDEP conduct routine monitoring of Sanibel Slough. The NPDES surface water monitoring program of the City of Sanibel provides data to evaluate the water quality status of the Sanibel Slough watershed. Additionally, in section 5.3 of the report the FDEP recommends that the current water quality and water level monitoring of Sanibel Slough should continue and be expanded, as necessary, during the implementation phase to ensure that adequate information is available for tracking

EPA HIERARCHY 1 REVIEW DOCUMENT

Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

restoration progress. Data collected through these monitoring activities will be used to evaluate the effect of best management practices (BMPs) implemented in the watershed on estuary TN and TP loads in subsequent water quality assessment cycles.

The Marine Lab of SCCF, a non-profit research and conservation facility, conducted an intensive study of potential nutrient loadings from the surficial aquifer to provide a framework for the development of a nutrient management plan for the City of Sanibel. Water quality data was gathered, analyzed and presented with an emphasis on revealing possible regional and local influences on Sanibel's water quality. A Basin Management Action Plan (BMAP) will be developed by the FDEP, working with the City, to help guide nutrient reductions to achieve compliance within a specified timeframe. Water quality monitoring and project tracking plans will be part of the BMAP.

Assessment: Although not a required element of the EPA's TMDL approval process, the FDEP indicated that several stakeholders would be carrying out monitoring activities in Sanibel Slough, which would help to gauge the progress toward attainment of WQS. The EPA is taking no action on the monitoring plan.

9. Implementation Plans

On August 8, 1997 Bob Perciasepe (EPA Assistant Administrator for the Office of Water) issued a memorandum, "New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs)," that directs Regions to work in partnership with states to achieve nonpoint source LAs established for 303(d)-listed waters impaired solely or primarily by nonpoint sources. To this end, the memorandum asks that Regions assist states in developing implementation plans that include reasonable assurances that the nonpoint source LAs established in the TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. The memorandum also includes a discussion of renewed focus on the public participation process and recognition of other relevant watershed management processes used in the TMDL process. Although implementation plans are not approved by the EPA, they help establish the basis for the EPA's approval of the TMDL.

The report discusses various mechanisms that are used to implement a TMDL which may occur through specific requirements in NPDES wastewater and MS4 permits, and through local or regional water quality initiatives or BMAPs. Facilities with NPDES permits that discharge to the TMDL waterbody must respond to the permit conditions that reflect target concentrations, reductions, or WLAs identified in the TMDL.

During June 2016, the City of Sanibel Natural Resources Department reported that over the next several years, the City would be implementing a number of important projects and programs. One such project would be the Community Lakes Best Management Practices Program to assist homeowners living adjacent to wetlands, lakes and other waterbodies implement BMPs aimed at protecting and improving water quality. Another important project that the City was already working on was the Jordan Marsh Water Quality Treatment Park. This project would collect stormwater runoff from commercial and residential properties along Periwinkle Way and filter it through a series of wetland treatment areas prior to discharge into the Sanibel Slough. The City was also evaluating options for upgrades to the Donax WRF that would help reduce nutrients in the reuse water delivered to island golf courses and residential properties. These upgrades were expected to significantly reduce nutrient loading to surface and groundwater resources.

EPA HIERARCHY 1 REVIEW DOCUMENT

Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

Assessment: Although not a required element of the TMDL approval, the FDEP discussed how information derived from the TMDL development process would be used to develop and implement BMPs that support implementation of the TMDL. The EPA is taking no action on the implementation portion of the submission.

10. Reasonable Assurances

EPA guidance calls for reasonable assurances when the TMDL is developed for waters impaired by both point and nonpoint sources. In a water impaired by both point and nonpoint sources, where a point source is given a less stringent WLA based on an assumption that nonpoint source load reductions will occur, reasonable assurance that the nonpoint source reductions will happen must be explained in order for the TMDL to be approvable. This information is necessary for the EPA to determine that the load and wasteload allocations will achieve WQS.

In a waterbody impaired solely by nonpoint sources, reasonable assurances that load reductions will be achieved are not required in order for a TMDL to be approvable. However, for such nonpoint source-only waters, states are strongly encouraged to provide reasonable assurances regarding achievement of LAs in the implementation plans described in section 9, above. As described in the August 8, 1997 Perciasepe memorandum, such reasonable assurances should be included in state implementation plans and "may be non-regulatory, regulatory, or incentive-based, consistent with applicable laws and programs."

A study to guide the development of a Comprehensive Nutrient Management Plan conducted by Thompson and Milbrandt (2013)³ of the SCCF and referenced in the report, indicates that residential fertilizer application was estimated to be the largest single source of TN and TP to landscapes in the Sanibel Slough watershed. Hence BMPs directed at reducing residential fertilization, reducing nutrient runoff from residential lands, and reducing the volume of stormwater runs off would be the most effective tool in reducing loadings from the Sanibel watershed. The City of Sanibel has already implemented BMPs associated with the fertilizer ordinance and native vegetation requirements and statistical analysis has shown strong evidence that these have been successful at lowering inorganic nitrogen loads in Sanibel Slough.

Assessment: The EPA considered the reasonable assurances contained in the report. Point sources are required to comply with their NPDES permits, which must include the requirements and assumptions of the H1. Reductions for nonpoint sources are expected to occur as a result of several incentive and voluntary programs that were already in place or will be developed with active participation of its stakeholders.

11. Public Participation

EPA policy is that there must be full and meaningful public participation in the TMDL development process. Each state must, therefore, provide for public participation consistent with its own continuing planning process and public participation requirements (40 CFR section 130.7(c)(1)(ii)). In guidance, the EPA has explained that the final TMDL submitted to the EPA for review and approval must describe the state's public participation process, including a summary of significant comments and the state's responses to those comments. When the EPA establishes a TMDL, EPA regulations require the EPA to publish a notice seeking public comment (40 CFR section 130.7(d)(2)).

³ Thompson, M., and E. Milbrandt. 2013. *Summary and evaluation of the surface water quality of Sanibel to guide development of a comprehensive nutrient management plan*. Sanibel, FL: SCCF Marine Laboratory.

EPA HIERARCHY 1 REVIEW DOCUMENT

Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

Inadequate public participation could be a basis for disapproving a TMDL; however, where the EPA determines that a state has not provided adequate public participation, the EPA may defer its approval action until adequate public participation has been provided for, either by the state or by the EPA.

A public meeting to explain the process of the TMDL development was held on November 19, 2014. A notice of development of rulemaking to initiate TMDL development was published in the Florida Administrative Register (FAR) Volume 43, Number 10, January 17, 2017. A public workshop was conducted by the FDEP on June 6, 2017, in Sanibel, Florida, to obtain comments on the draft nutrient TMDL for Sanibel Slough. A notice of proposed rule to adopt the TMDLs (which would also constitute site-specific numeric interpretations of the narrative nutrient criterion set forth in paragraph 62-302.530(90)(b), F.A.C.,) was published in the FAR Volume 43, Number 132, July 10, 2017. The FDEP also held a public hearing on August 25, 2017, in Tallahassee, Florida which was advertised through websites, email lists, and FAR.

Written comments were received from several entities (Applied Technology & Management on behalf of FDOT, Lee County, AIM Engineering and Surveying, SCCF, and the City of Sanibel) for Sanibel Slough West and Sanibel Slough East. The FDEP reported that they had addressed the comments, as appropriate, in the revised TMDL report.

Assessment: The EPA concludes that the state involved the public during the development of the H1, provided adequate opportunities for the public to comment on the report, and provided reasonable responses to the comments received.

12. Submittal Letter

A submittal letter should be included with the TMDL analytical document and should specify whether the TMDL is being submitted for a technical review or is a final submittal. Each final TMDL submitted to the EPA must be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under section 303(d) of the CWA for EPA review and approval. This clearly establishes the state's intent to submit, and the EPA's duty to review, the TMDL under the statute. The submittal letter, whether for technical review or final submittal, should contain such information as the name and location of the waterbody and the pollutant(s) of concern.

Assessment: Accompanying the State's (August 2017) final TMDLs for nutrients was a submittal letter from the FDEP General Counsel, Robert A. Williams, dated March 15, 2018, requesting the review and approval of the nutrient TMDLs for Sanibel Slough West and Sanibel Slough East.

EPA HIERARCHY 1 REVIEW DOCUMENT
Sanibel Slough (WBIDs 2029F1 and 2029F2)/ Charlotte Harbor Basin – Nutrients

III. Conclusion

The Water Protection Division is **APPROVING** the H1 NNC and TMDLs addressed by this decision document in accordance with sections 303(c) and 303(d) of the CWA, as consistent with the CWA and 40 CFR parts 131 and 130, respectively.

The H1 NNC presented in this decision document will constitute the site-specific numeric interpretation of the narrative nutrient criterion set forth in paragraph 62-302.530(48)(b), F.A.C. for this particular water, pursuant to paragraph 62-302.531(2)(a)1.b., F.A.C. Based on the chemical, physical, and biological data presented in the development of the H1 NNC outlined above, the concludes that the revised NNC for TN, TP, and Chla provide for and protect healthy, well-balanced, biological communities in the waters to which the NNC apply and are consistent with the CWA and its implementing regulations at 40 CFR 131.11.

Therefore, the revised nutrient criteria for TN and TP for Sanibel Slough West are 1,903 kg/yr for TN and 241 kg/yr for TP expressed as 3-year average loads, not to be exceeded. The revised nutrient criteria for TN and TP for Sanibel Slough East are 1,091 kg/yr for TN and 123 kg/yr for TP expressed as 3-year average loads, not to be exceeded. The revised criterion for Chla is 11 µg/L for Sanibel Slough West and 21 µg/L for Sanibel Slough East, expressed as an AGM not to be exceeded more than once in any consecutive 3-year period. All other criteria applicable to this waterbody remain in effect. The requirements of paragraph 62-302.530(48)(a), F.A.C. also remain applicable.

Furthermore, after a full and complete review, the EPA finds that the H1 for Sanibel Slough/ Charlotte Harbor Basin for TN, TP, and Chla satisfies all of the elements of approvable TMDLs. This approval is for the *Nutrient TMDL for Sanibel Slough (WBIDs 2092F1 and 2092F2)* addressing two waterbodies for use impairments due to nutrients based on elevated TSI values.